[Total No. of Questions: 09] [Total No. of Pages: 02]
Uni. Roll No. ....

Program: B.Tech. (Batch 2018 onward)
Semester: 3
Name of Subject: Signals and Systems   MORNING
Subject Code: PCEC-103
Paper ID: 16033   1 3 JUN 2023
Scientific calculator is Allowed.

Detail of allowed codes/charts/tables etc. Not applicable
Time Allowed: 03 Hours   **Max. Marks: 60**

NOTE:

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately

<div align="center">Part – A</div>   [Marks: 02 each]

Q1.

    a) Define Transfer function of a system.
    b) Explain time shifting operation by plotting any arbitrary signal.
    c) Explain Dirichlet conditions for Fourier series.
    d) How noise temperature and noise factor are related to each other?
    e) Compare Cumulative distribution function and Probability density function.
    f) Determine Nyquist rate, if input signal is $2.\cos(24\pi t)$.

<div align="center">Part – B</div>   [Marks: 04 each]

Q2. Explain various types of continuous-time signals.

Q3. Prove Parseval's theorem.

Q4. Illustrate any three properties of Linear-Time Invariant systems.

Q5. Determine convolution of $x_1(t) = e^{-2t}. u(t)$ and $x_2(t) = e^{-4t}. u(t)$ using convolution integral.

Q6. Determine the probability of getting a sum of 7 when two dice are thrown.

Q7. Evaluate signal to noise ratio, if signal power is 5mW and noise power is 2mW. Also, calculate the ratio in decibels.

<div align="center">Part – C</div>   [Marks: 12 each]

Q8. Illustrate the significance of probability theory for signals

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OR
Explain various types of noises present in electronic systems.

Q9. Examine various operations in the following signals graphically:
- (i) $u(t) + u(t-2)$
- (ii) $-3 . u(t)$
- (iii) $2 . \exp(t)$
- (iv) $r(-t)$
- (v) $u(t) + u(-t)$

OR

Determine fourier transform of (i) $x(t) = e^{-2t} . u(t)$, and (ii) $x(t) = \delta(t-3)$

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